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Drum Membrane.**

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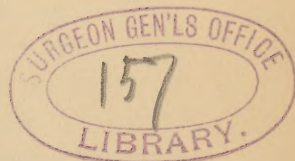


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PULSATION at the bottom of the auditory canal has, since the time of Wilde, been regarded as pathognomonic of perforation of the drum-membrane. Though this statement has been repeated by various writers, and is undoubtedly in nearly every case correct, yet exceptions are occasionally to be met with. For instance, pulsation is, as has been remarked by Hinton and Roosa, encountered in a thin drum-membrane, in a state of acute catarrhal inflammation. This condition is, however, a rare one, for in an aural service of over eight years at the New York Eye and Ear Infirmary, I met with not more than four cases of this kind. But the following cases, with that reported by Dr. A. H. Buck, in another part of this journal, will show that this symptom of pulsation may be due to a cause that I would have said was hitherto unknown but for an article published by Schwartze,¹ in 1864, on the subject of "Pulsation in an uninjured Drum-membrane."

This author gives two cases of his own, and one communicated to him by Tröltsch. In that of Tröltsch there was pulsation in an intact drum-membrane without congestion; the case is imperfect in its details, and was confessedly obscure. The second of Schwartze's cases was probably due to acute catarrhal inflammation, as the pulsation disappeared with the congestion. In his first case, however, in a patient with symptoms of advanced chronic catarrh of the middle ears, there was found on the left side—the drum-membrane of which was white and somewhat lustreless—and near the apex of the light spot, a pulsating-point, the size of a pin's head, synchronous with the radial artery. These pulsations ceased when the Valsal-

¹ Archiv f. Ohrenheilkunde, Bd. 1, p. 140.

vian experiment was resorted to, but returned in a short time. No injection whatever of the membrane was present. There was no tinnitus or pain in either ear, nor had the patient ever experienced any subjective sensations of sound. No treatment was apparently resorted to. Such was all the information that I was able to obtain, that threw any light upon the following case :

CASE I.—Mrs. J. A., ætat. 35, was sent to me in November, 1870, by Dr. J. T. Metcalfe, for deafness of the right ear, which had begun about a year previously, had rapidly increased during the past few months, and was associated with a disagreeable, though regularly pulsating, noise ; there had been no pain or discharge. At times slight attacks of vertigo had been experienced.

On examination, H. D. right side = $\frac{1}{20}$; left, normal. After I had removed a slight layer of cerumen, a remarkable appearance presented itself. The whole drum-membrane was evenly and intensely reddened and strongly pushed forward in a bulging manner, except along the line of the malleus, which was situated apparently in a depression, and was marked at its free end by a white spot, in strong contrast to the other parts of the membrane. The whole membrane pulsed visibly and strongly, especially so superiorly, where there was a broad light spot. The pulsation was synchronous with that of the carotids, and was arrested by pressure on the artery of the corresponding side. No distinct vessels were to be seen on the membrane, only a general redness. By Siegle's tympanoscope, the drum-membrane could be forced in but little, and the pressure only rendered the pulsation more broadly and decidedly marked, and particularly so near the inner side of the malleus. By the otoscopic tube the heart sounds were distinctly heard, but not so on the sound side. No air could be felt to enter the tympanic cavity by Valsalva's or Politzer's method, nor by the catheter. No redness or abnormal change was noticed in the external auditory canal.

Thinking at first that I had to do with an exaggerated case of bloody serum in the middle ear, paracentesis was resorted to at the middle of the posterior segment, giving exit to blood which rapidly filled up the canal and flowed to the amount of $\frac{3}{4}$ i. in a few seconds, but was easily arrested by plugging the canal for a few moments with cotton. Attempts were made to inflate the tympanic cavity by the catheter, after bougieing the Eustachian tube up to its isthmus, but no air emerged from the puncture. On inspection no change in the appearance of the drum-membrane had resulted from the puncture, but three days later, when paracentesis was again resorted to, and after the cessation of a moderate hemorrhage, the drum was found collapsed and somewhat wrinkled ; the hearing also was found to have increased to $\frac{2}{25}$. This improvement in hearing and condition of the drum-membrane only continued until the next day, and the pulsation was then felt as decidedly as ever by the patient,

though to the eye it was much more feeble. I had by this time come to the conclusion that I had to deal with a vascular tumor in the middle ear, or that I had, according to Schwartze, a hypertrophied condition of the mucous membrane associated with an accumulation of bloody serum in the cavity. Leaning, however, to the first view, a consultation with Dr. Simrock, an acknowledged aural authority, was suggested and carried out. Dr. Simrock thought that the difficulty was due either to fluid in the middle ear, or, as he thought that he succeeded in forcing air through the Eustachian tube, that it was a collection of fluid in the tissue of the drum-membrane itself. A third puncture was made posteriorly, carrying the needle in until it reached the promontory—no air could be forced out. Convinced of the correctness of my diagnosis, on December 5th, a fourth puncture was made with a large needle, and a probe dipped in pure nitric acid was inserted through the opening into the middle ear. But little pain was occasioned by this treatment. As a result of the several punctures, it was noticed not only that after each the hearing distance increased, but that the pulsation became less distinct. This subsidence became more and more permanent, but the cicatrices of the punctures, yielding under the pressure from within, protruded almost teat-like from the drum-membrane, and after this application of acid a mass projected through the opening there made and spreading out, and pulsating faintly, obscured nearly the whole membrane, and assumed a polypoid appearance in the course of a week. This mass was punctured and a probe dipped in liq. ferri persulph. introduced into its depths, blanching it at once. The subsequent history is in brief this: the mass sprouting from the opening in the drum-membrane was with difficulty destroyed by the use of nitric acid applied first every second or third day for a number of times, afterwards, at intervals of one or two weeks (as the patient lived out of the city); and subsequently, as the tissue became tougher, by the use of the acid nitrate of mercury, which was carried, by means of a thin film of cotton around the end of a fine wire, through the tympanic opening into the cavity itself. At times considerable pain was caused by the applications, but, as a rule, they were less distressing than would have been anticipated. Several attempts were made to extract pieces of the mass for microscopical examination, and the one or two small portions so obtained were reported, by Dr. A. H. Buck, to show nothing but scales of epidermis and débris so changed by caustics as to be unrecognizable.

By this treatment, the tumor, in the course of four to five months, was apparently destroyed, and it was observed that in the later cauterizations, little or no hemorrhage occurred, and that when the punctures and applications—for they were sometimes conjoined—were carried into the tympanic cavity, the sensation was given that that space was more or less filled with a solid tissue. No air at any time was felt in middle ear.

On July 1, 1871, three weeks after the cessation of treatment, it is noted

that H. D. = $\frac{2}{20}$; bottom of canal closed by a smoothly depressed fleshy-looking membrane, still considerably though irregularly injected. No pulsation whatever to be seen or heard by the physician, and only very slightly perceived by the patient.

Aug. 4.—Mrs. A. presented herself, on her way from Newport, stating that she only had occasional pulsation in the ear in the erect position, but always when in bed. On examination it was found that the membrane had changed from its former fleshy appearance to one more natural. Now the malleus could be defined; the membrane itself was still irregularly patchy, of a pink hue in spots, but with some translucency. By the use of Politzer's inflation, for the first time air is heard to enter the middle ear by the otoscope. Ordered Valsalva's experiment to be practised at home.

Nov. 14.—Drum membrane is quite normal in the posterior part. Malleus clearly seen. Anteriorly, two months ago, was seen a red bulging spot, as if the tumor was returning there, but this to-day is not seen; the drum-membrane at this point being now mottled with white bands running from malleus to the periphery. Tube slightly open by Valsalva's method; by Politzer's method air readily enters. H. D. = $\frac{3}{20}$ — $\frac{4}{20}$. To use Politzer's bag daily.

Feb. 7, 1872.—H. D. = $\frac{8}{20}$. Only hears pulsation when in bed. Drum-membrane still mottled and sparsely injected. No evidence of return of tumor.

Dec., 1878.—No recurrence of the tumor. Reports herself as hearing well. Ear giving her no trouble whatever. As patient was met in the street, exact information could not be obtained.

In the second case there was apparently a vascular growth on the posterior wall of the tympanum, with an accumulation of serum overlaying it.

CASE II.—A negro woman, ætat. 35, was seen by me Dec. 8, 1870, with the history that for four years past she had had "beating noises" in the left side of her head, which were much increased by stooping, which position would also cause severe dizziness. Vertigo came on at times in the erect position. The hearing on the same side had also failed, and on her visit to me was $\frac{1}{20}$ while on the left side it was normal. She believed that her heart was affected, as she so distinctly and so persistently heard the sounds in her ear. There was, however, no cardiac lesion. She was much depressed and anxious by reason of her ear trouble. On inspection it was perceived that the posterior surface of the drum-membrane, and more especially its inferior portion, was of a reddish hue, with some vessels running over it, and that it was not only bulged outwards, but that it visibly pulsated synchronously with the heart. Considerable injection of the malleus was also present. The Eustachian tube was pervious. By Siegle's otoscope it was seen that a faint line half-way up the posterior seg-

ment was movable. Paracentesis was, therefore, resorted to and blood rapidly filled the canal, but was readily checked by a mop of cotton left a few moments against the drum. Politzer's inflation being then used, air freely escaped through the opening in the drum-membrane. After which H. D. = $\frac{3}{20}$. She was not seen again until June 1, 1871, when she returned with the statement that since the puncture she had been very much better, and her hearing had improved and kept in fair condition until a week previously, when the latter rapidly diminished. Now H. D. = $\frac{4}{20}$. Left drum-membrane translucent everywhere, except at postero-inferior portion, where a roundish red spot, the size of a small pea, was seen projecting forward, but not pulsating. By Siegle's apparatus fluid line was again detected; it was rendered more clear after Politzer's inflation had been successfully used. Projection outward apparently the same.

July 15.—Paracentesis used for a second time, causing not only H. D. to rise to $\frac{1}{10}$, but also disappearance of the pulsating noise and redness. This absence of pulsation was only noticed a few days.

Aug. 1.—Returned with symptoms of dizziness, deafness, and pulsation. Fluid seen in tympanic cavity. Redness and pulsation in drum-membrane observed as at first. Paracentesis, with needle carried in until it was arrested by bony resistance.

Nov. 7.—Repeated paracentesis. Says that after every puncture the sound is lessened in intensity.

Dec. 11.—Paracentesis twice in past week, and a probe wet with liq. ferri persulphat. also introduced.

She was not seen subsequently until Feb. 18, 1873, when the tumor was seen projecting still on the posterior and inferior segment of the drum, pulsating and of a red color. Dizziness complained of more than ever. H. D. = 0. Up to March 24, paracentesis was performed three times, with the subsequent introduction of cotton wound round a cotton probe and dipped into acid nitrate of mercury. This kept the opening patent, and several applications through it of a solution of chromic acid (100 gr. to $\frac{3}{4}$ i.) were made. Pulsation scarcely seen, and heard much less distinctly by the patient. Dizziness has also ameliorated.

April 25.—For the past three weeks she has been free from vertigo and pulsating noises. After a rest of two weeks after last state, a new and long slit was made in the drum-membrane, and the chromic acid freely applied in the drum cavity by the cotton probe. Considerable swelling and discharge followed. This has nearly all subsided and she feels better in her head than she has felt in five or six years. She can now stoop down, and do her work without any unpleasant pulsation.

June 25.—Has had the paracentesis and chromic acid used but twice since last note. She has steadily improved, having had no pulsation and no dizziness until about ten days ago, when both were noticed after violent exertion.

By the speculum the lower part of the drum was found to be quite normal, save a few cicatricial traces. At the upper part posteriorly and advancing a little forward on the roof of the external auditory canal is seen a reddish mass about two lines wide and about three long, not pulsating, but evidently an extension of the angioma. She was then going into the country, and promised to return to me in the autumn if any further symptoms arose. She, however, did not do so. I have recently heard of her death in 1875, from phthisis. From her friends I learn that the noises in her ear slowly increased, and for several months prior to her death they caused her much annoyance and distress.





